Joint Group on Pollution Prevention

Chartered by Joint Logistics Commanders

JG-PP
Partnering for Progress

Joint Technology Exchange Group Meeting

24 - 26 July 2001

Lorraine Wass

Naval Air Systems Command

Industrial Operations

AIR 6.3.4.2.2/8.7 Pollution Prevention

Overview

Who is JG-PP?

Why JG-PP?

What are the roles in the JG-PP process?

What has JG-PP done thus far?

Who is JG-PP

DoD/NASA flag officer group

- Originally created in 1995 at industry request
- Chartered by Joint Logistics Commanders/NASA HQs

Chartered to

- Reduce or eliminate system hazardous material requirements
- Avoid duplication of effort
- Reduce technical risk
- Transfer technology
- Leverage opportunities -- reduce costs

Focus on

- Acquisition (Contractor design) and sustainment community needs
- Manufacturing and maintenance processes

JG-PP Leadership

Joint Logistics Commanders

General John G. Coburn
Commander
Army Materiel Command

Vice Admiral James F. Amerault
Deputy Chief of Naval Operations, (Logistics)

General Lester L. Lyles
Commander
Air Force Materiel Command

Major General Paul M. Lee
Commander
Marine Corps Materiel Command

Lt.. General Henry T. Glisson
Director
Defense Logistics Agency

JG-PP Principals

Major General David R. Gust
Deputy Chief of Staff for Research, Development and Acquisition
HQ, Army Materiel Command

Rear Admiral Larry C. Baucom
Director, Environmental Protection, Safety and Occupational Health
Chief of Naval Operations (N45)

Major General Paul L. Bielowicz
Director of Logistics
HQ Air Force Materiel Command

Mr. Ken Trammell
Deputy Commander, Logistics Operations
Marine Corps Logistics Bases

Brigadier Gen Edward M. Harrington
Commander
Defense Contract Management Agency

Ms. Olga Dominquez
Director, Environmental Management
National Aeronautics and Space Administration

Working Group (JASPPA)

Mr. George Terrell
AAPPSO
HQ Army Materiel Command

Mr. Winston DeMonsabert
Pollution Prevention Branch
Chief of Naval Operations (N451W)

Ms. Debora Meredith
Chief, Logistics Environmental Office
HQ, Air Force Materiel Command

Mr. John Wolfe
Marine Corps Logistics Bases

Mr. Dave James
Defense Contract Management Agency

Mr. Robert Hill
Kennedy Space Center
National Aeronautics and Space Administration

Why JG-PP

Joint participant approach

Leverage funding sources

Share workload

Benefit from diverse experience base

Proven methodology

Improve communication

Right People, Right Place,
Right Time For Decisive Action

Roles in JG-PP process

Identify requirements for project

- JG-PP assists participants in identifying shared needs and contacting stakeholders

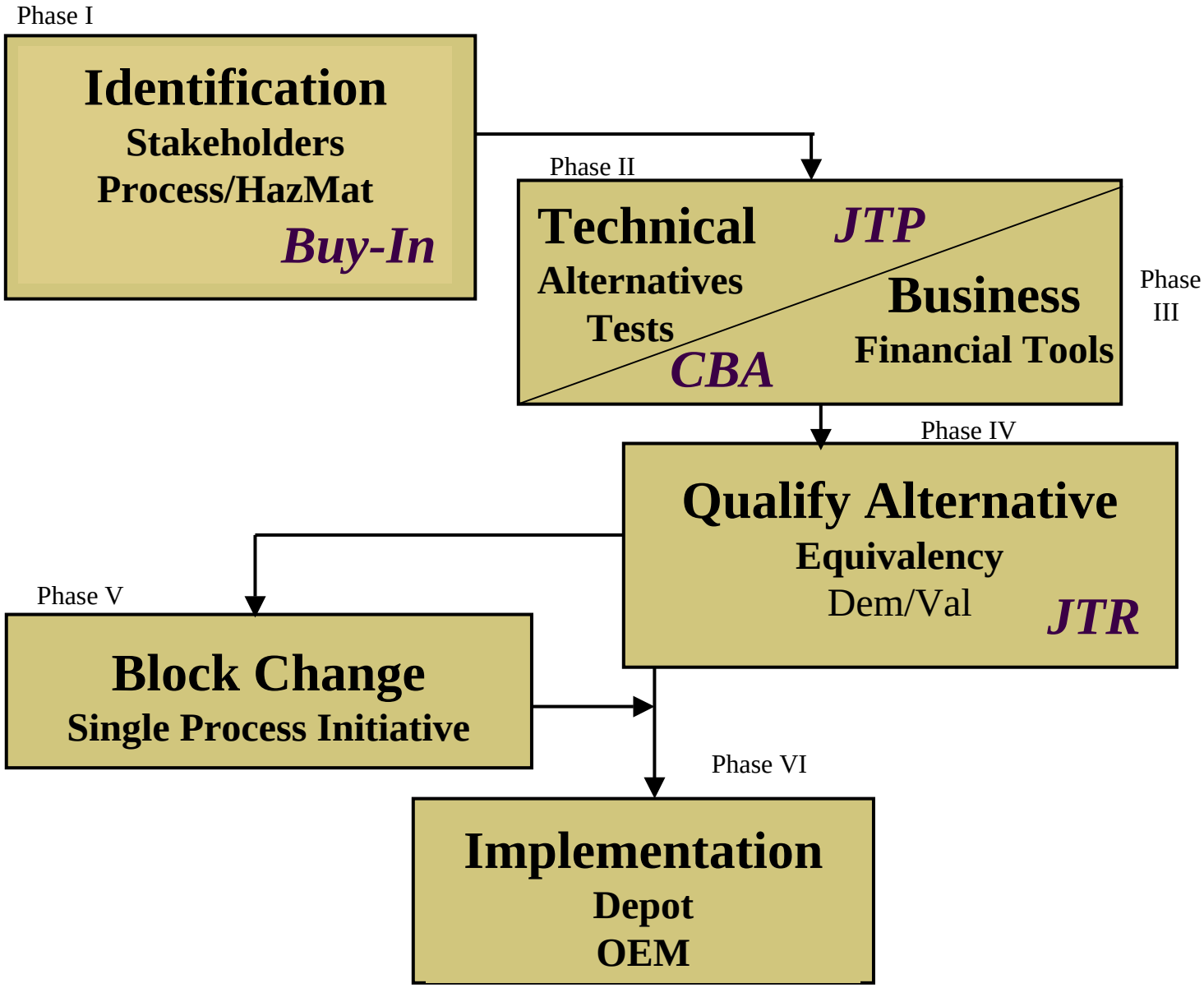
Stakeholders

- Establishes required tests and acceptance performance criteria
- Determines alternatives to be tested
- Approves JG-PP documents
- Determines if alternative will be implemented

JG-PP

- Facilitates the process
- Coordinates the meetings, take minutes, etc
- Creates documents for coordination, approval
- Advocates for funds
- Assists in implementation, if required

JG-PP Methodology



JG-PP Products

Potential Alternatives Report (PAR)

- Documents alternative selection process

Joint Test Protocol (JTP)

- Defines tests required to qualify/validate alternatives

Joint Test Report (JTR)

- Documents test results

Cost Benefit Analysis (CBA)

- Quantifies economic effects
- Supports business case
- Used as a decision tool
- Limited distribution

Qualified Alternatives

What has JG-PP done

Pioneered workable joint partnering

- Created pragmatic, stakeholder driven method

Acquisition reform in action

- First technical block change at Raytheon

Created partnerships on 18 active projects

Created cost/benefit analyses process

- Meets DCAA needs, when required

JG-PP Projects

Non Chromate Primers for A/C Exterior

Boeing Aircraft And Missiles Company

F-15 Test Aircraft at Tyndall AFB, FL

F/A-18 Tests in Persian Gulf

Description:

Reduce chrome and VOCs on aircraft outer mold line for F-15, C-17, F/A-18, T-45, Harpoon/SLAM, AV-8B

Potential Alternatives:

Dexter 10PW22-2/ECW-119
PRC-DeSoto EWAE 118 A/B

Benefit/Impact:

- Affects defense systems across all services
- Depot recurring savings - up to $1.6M/yr
- Reduce VOC and chrome emissions up to 60%
- Reduces worker exposure and hazardous waste
- Results leveraged by NASA (Columbia Space Shuttle)
  - NASA used existing JG-PP test data
  - Nonchromate primer tested on flipper doors (every other one)

Milestones:

- Project Kickoff Meeting May 1995
- Completed JTP Dec 1997
- Complete PAR May 1998
- Lab testing complete Mar 1997
- Operational Testing May 1997 - Dec 2001
- Final report - Jan 2002
- Block Change - expected Feb 2002

Status:

- Active

JG-PP Projects (continued)

Low-VOC Coatings for Medium Caliber Ammunition

20 mm

Description:

- Qualify alternatives to high-VOC coatings for medium caliber (20mm, 25mm, 30mm) ammunition projectile bodies
- VOCs include MEK, toluene, butylcellosolve, MIBK, xylene
- Three munitions manufacturers:
  - » Alliant Techsystems (MN)
  - » Primex Technologies (CA)
  - » Galion Inc (OH)

Potential Alternatives:

- Selected four candidate alternatives for testing:
  - » KEM AQUA® (waterborne)
  - » TioTech 40® (waterborne)
  - » MIL-P-11414 (alkyd primer)
  - » KS-5 (UV-curable)

Benefit/Impact:

- Affects 18 ammunition types and 9 weapons
- OEM financial benefits for replacing high-VOC painting with waterborne range from -$530K to $100K annual cost avoidance & -$3.2M to $0.65M NPV

Milestones:

• Kickoff Meeting	Aug 1999
• Completed JTP	Apr 2000
• Phase I Testing	Aug 2000 - Jul 2001
• Operational Testing	Jun 2001 - Jun 2002
• Final Report	Aug 2002

Status:

- Active

JG-PP Projects (continued)

Low-VOC Coating Systems for Support Equipment

Description:

- Qualify multiple low to No HAP, non-Cr coating systems for use on support equipment used in DoD and NASA operations
- Leverage results of previous Service/ NASA efforts and coordinate with Joint Panel on Aviation Support Equipment

Potential Alternatives:

Five coating system alternatives have been selected:

- (2) Powder Coating System(s)
- (2) Waterborne Coating System(s)
- (1) High Solids Coating System(s)

Benefit/Impact:

- Reduce/eliminate VOC emissions and hazardous waste
- Compliance relief for depot and field activities
  - CAA, NESHAP, CAA, RCRA
- Standard coating systems for DoD and NASA legacy and new acquisition support equipment

Milestones:

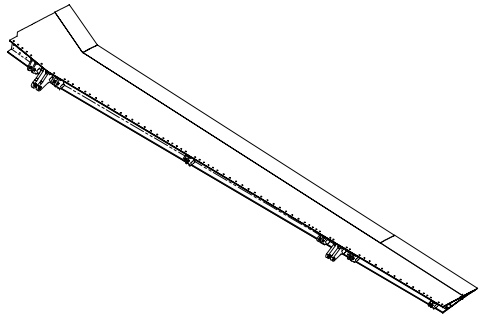
• Kickoff Meeting	Jun 1999
• Complete JTP	Nov 1999
• Complete PAR	Jul 2000
• Begin lab testing	Jun 2000
• Draft JTR	Jun 2001
• Begin field testing	Aug 2001
• Complete all testing	Early 2003

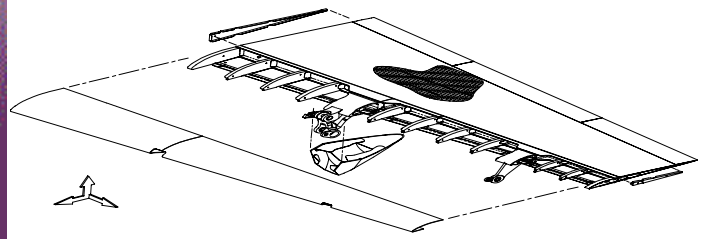
Status:

- Active

JG-PP Projects (continued)

Low VOC Adhesive Bonding Primer





BONDED PARTS
Aileron (Al)
TEF Shroud (Al)
Inner Wing skin (Ti)
Vertical skin (Ti)
Leading Edge of Vertical (Ti)
Rudder (Al)
Horizontal (Ti)

Description:

- Demonstrate and qualify a commercially acceptable low VOC adhesive bonding primer across all affected military platforms.

Benefit/Impact:

- Affects defense systems across all services
- Reduce VOC's emissions
- Reduced compliance risk
- Reduce worker exposure risk

Milestones:

- Kickoff meeting 19 April 2001
- Identify Stakeholders In progress

Status: Active

JG-PP Projects (continued)

Portable Laser Coating Removal System

Description:

- Demonstrate and validate a coating removal system using a portable hand-held laser

Potential Alternatives:

The selected alternatives are:

- Lynton (UK): ND:YAG
- SLCR (GE)L TEA-CO_2
- Laserline (GE) : Diode
- Quantel: ND:YAG

Benefit/Impact:

- Reduce/eliminate VOC emissions and hazardous waste
- Compliance relief for depot and field activities
  - CAA, NESHAP, CAA, RCRA
- Standard coating systems for DoD and NASA legacy and new acquisition support equipment

Milestones:

• Kickoff Meeting	Jun 1999
• Complete JTP	Jan 2001
• Complete PAR	Feb 2001
• Phase I Testing	Feb01 - Aug 01
• Phase II Testing	Aug 01 - Jan 02
• Phase III Testing	Jan 02 - Dec 02
• Phase IV Testing	Jan 03 - Sep 03
• Final Report	Dec 03

Status:

- Active

JG-PP Projects (continued)

Alternatives to Electrodeposited Cadmium

The Boeing Company (formerly Boeing Information, Space and Defense Systems)

Description:

- Eliminate electrodeposited cadmium on various aerospace components
- Desire corrosion protection and lubricity

Potential Alternatives:

- Electrodpoisted Tin-Zinc
- Alkaline Electrodeposited Zinc-Nickel
- IVD-Aluminum

Benefit/Impact:

- Affects 23 defense systems including B-1B, B-2, B-52H, CH-47, F-22, IUS, KC-135, V-22, E-6 Tacamo, CH-46
- Reduces cadmium emissions
- Reduces waste management costs
- Reduces compliance risk
- Reduces worker exposure risk

Milestones:

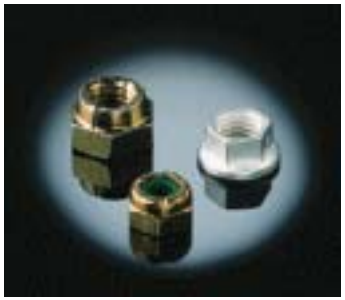
• Kickoff Meeting	July 1996
• Completed JTP	Jul 1998
• Began testing	Jan 1998
• Complete testing	July 2001
• Final report	Nov 2001

Status:

- Active

JG-PP Projects (continued)

Joint Cadmium Alternative Team (JCAT) Projects



Common Fasteners

Electrical Connectors

Plating

Description:

- The objective of the JCAT is to reduce and if possible eliminate the use of cadmium on all DoD and NASA hardware.
- Primary process focus is electroplating.

Potential Alternatives:

- Tin-zinc
- Zinc-nickel
- Al-manganese
- IVD aluminum
- Sputtered Al
- Alumiplate
- LASER Induced Surface Improvements (LISI)

Applications:

Corrosion protection and lubricity for high- and low-strength steels and other metal alloys. Initial focus applications:

- Alternatives to cadmium electroplating for non-aerospace applications (BISDS follow-on)
- Fasteners
- Springs
- Structural components
- Electrical connectors

Milestones:

- Kickoff Meeting Jan 2000
- Boeing Information and Space Defense Systems
  - Estimate JTR in Mid-2001
- Electrical Connectors testing in Mid- 2001
- Fasteners in testing by Late- 2001
- Structural components and Springs testing by late 2001
- Joint Test Report by early 2002

Status:

- Active

JG-PP Projects (continued)

Nonchromate Aluminum Pretreatments

Description:

- Purpose of project is to demonstrate and validate the performance on nonchromate aluminum pretreatments on DoD and aerospace test platforms
- Eliminate the ESOH issues associated with chromated aluminum pretreatments

Alternatives:

- Alodine 2000, Alodine 5200, Bi-K, Brent Chem Kote, Chemidize 727A, Trivalent CP, X-IT PreKote, San Chem Safeguard 7000 with Seal #2 [Control: Alodine 1200S]

Benefit/Impact:

- Anticipate cost avoidance of approximately $0.10 to $2.23 per square foot of surface treated.

Milestones:

• Kick off project	Jan 2000
• Completed JTP	Dec 2000
• Complete Phase I Tests	Jul 2001
• Draft PAR	Dec 2001
• Complete Op Tests	2003
• Publish Test Results	2003 -2004

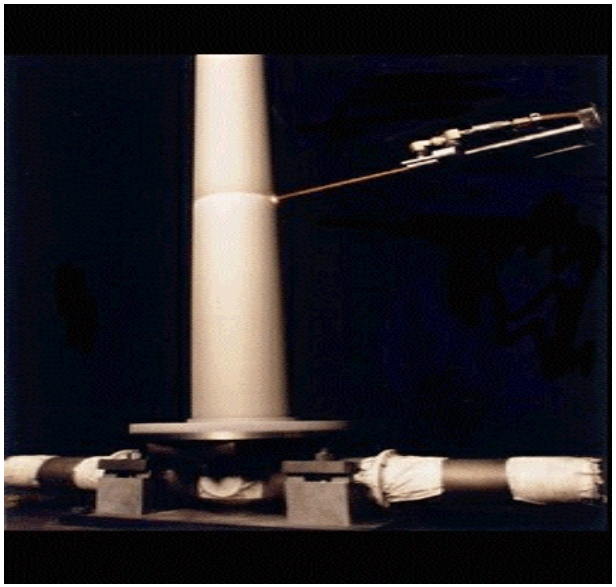
Status:

- Active

JG-PP Projects (continued)

hromium Electroplating Alternatives Projects for Aircraft Landing Gear

High Velocity Oxy-Fuel (HVOF) Technology Migration



Aircraft landing gear

Description:

Support the Hard Chrome Alternatives Team (HCAT) efforts to validate HVOF thermal spray coatings as a replacement for hard chrome plating for specific application on various landing gear components.

Potential Alternatives:

- Tungsten Carbide Cobalt (WC-17Co)
- Tungsten Carbide Cobalt Chrome (WC-10C04Cr)
- Tribaloy 400

Benefit/Impact:

- Reduces chromium emissions and discharges
- Reduces corrosion
- Increases life of wear components up to 8 times more than non-coated components
- Cost savings due to increased life and less downtime
- 29 DOD Programs

Milestones:

• Kickoff meeting	Jun 1997
• Complete JTP	Jul 1999
• Complete Phase I Test (coupon)	Aug 2000
• Complete Op Test	2002
• Publish test results	2000-2002

Status:

- Active

JG-PP Projects (continued)

Chromium Electroplating Alternatives Projects for Propeller Hubs

High Velocity Oxy-Fuel (HVOF) Technology Migration

Propeller hubs

Description:

Support the Hard Chrome Alternatives Team (HCAT) efforts to validate HVOF thermal spray coatings as a replacement for hard chrome plating for specific application on propeller hub components such as barrel-tailshaft and sleeve-lever support components

Potential Alternatives:

- Tungsten Carbide Cobalt (WC-17Co)
- Tungsten Carbide Cobalt Chrome (WC-10Co4Cr)
- Tribaloy 800 (Co, Ni based alloy)

Benefit/Impact:

- Reduces chromium emissions and discharges
- Reduces corrosion
- Increases life of wear components up to 8 times more than non-coated components
- Cost savings due to increased life and less downtime
- 4 DOD Programs

Milestones:

• Kickoff meeting	Aug 1998
• Complete JTP	Jan 2000
• Lab Test Complete	Apr 2001
• Begin Component Tests	April 2001
• Begin Flight Tests	Sep 2001
• Publish test results	2003

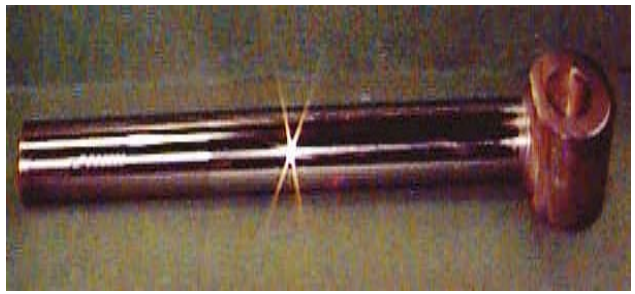
Status:

- Active

JG-PP Projects (continued)

Chromium Electroplating Alternatives Projects for Pnuematic Actuators

High Velocity Oxy-Fuel (HVOF) Technology Migration



Pneumatic actuators

Description:

Support the Hard Chrome Alternatives Team (HCAT) efforts to validate HVOF thermal spray coatings as a replacement for hard chrome plating for specific application on aircraft flight control and utility hydraulic and pneumatic actuators

Potential Alternatives:

- Tungsten Carbide Cobalt (WC/Co)
- Tungsten Carbide Cobalt Chrome ($WC/CoCr^{+3}$)

Benefit/Impact:

- Reduces chromium emissions and discharges
- Reduces corrosion
- Increases life of wear components up to 8 times more than non-coated components
- Cost savings due to increased life and less downtime

Milestones:

• Kickoff meeting	Apr 2000
• Final Draft JTP	Early 2002
• Begin Testing	2002
• Complete testing	2003
• Publish test results	2004

Status:

- Active

JG-PP Projects (continued)

Chromium Electroplating Alternatives Projects on Helicopter Dynamic Components

High Velocity Oxy-Fuel (HVOF) Technology Migration

Helicopter dynamic components

Description:

Support the Hard Chrome Alternatives Team (HCAT) efforts to validate HVOF thermal spray coatings as a replacement for hard chrome plating for specific application on various non-flight critical helicopter dynamic components

Potential Alternatives:

- Tungsten Carbide Cobalt (WC-17Co)
- Tribaloy 400

Benefit/Impact:

- Reduces chromium emissions and discharges
- Reduces corrosion
- Increases life of wear components up to 8 times more than non-coated components
- Cost savings due to increased life and less downtime
- Nine DOD Programs

Milestones:

- Kickoff meeting — Jan 2000
- Complete draft JTP — Mid 2002

Status:

- Active

JG-PP Projects (continued)

Solventless High Solid Ballast Tank Coating

Description:

Demonstrate and validate commercial, VOC compliant tank coating systems used in critical shipboard applications such as seawater ballast tanks and wet space applications.

Potential Alternatives:

Selected four alternatives for testing:

- International Integuard 180
- Jotun 591
- Sherwin-Williams Dura-Plate UHS
- Sigma Coatings Edgeguard

Benefit/Impact:

- Fleet #1 corrosion priority
- Meets pending VOC/HAP content requirements
- Triple service life (old 5-7 years vs. new 20 years)
- Migration to other storage tanks

Milestones:

- Begin project Aug 1998
- Laboratory testing underway
- NEHC approval received
- Completed Cost Benefit Analysis validation
- Expected project completion is 2000

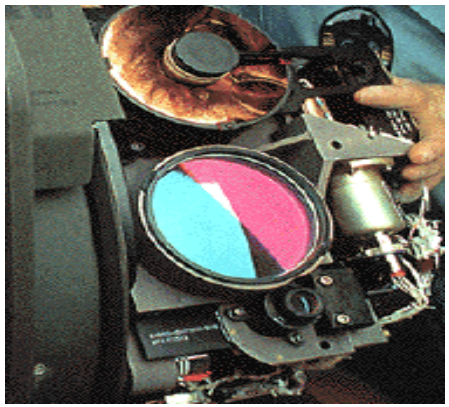
Status:

- Active

JG-PP Projects (continued)

Low-VOC Identification Marking

Lockheed Martin Electronics & Missiles and Information Systems Companies



LANTIRN - Stenciling

Description:

- Target HazMat is VOCs - MEK, toluene
- Shift from conventional epoxy stencil inks and paints to automated self-adhesive labels or low VOC inks

Potential Alternatives:

Alternative Inks
Self-Adhesive Labels

Benefit/Impact:

- 23 DoD Programs affected
- Anticipated benefits at two Lockheed sites & four DOD depots:
  - Reduce ~1500 lb/ yr VOC
  - Reduce 9800 lb/yr HazWaste
  - Depots -WR-ALC, NADEP JAX, Norfolk Naval Shipyard, Tobyhanna Army Depot
  - Total annual cost avoidance for the 6 facilities of $1M

Milestones:

• Kickoff Meeting	Jan 1996
• Technology Survey Completed	Oct 1997
• PAR Completed	Jul 1998
• Phase I Tests Completed	Sep 1999
• Phase II Test Completed	Oct 2000
• Demonstration at TYAD Complete	May 2001
• Final report	Mid 2001

Status:

- Active

JG-PP Projects (continued)

Lead-Free Dry Film Lubricants

Propulsion Environmental Working Group (PEWG)

Description:

- Support the PEWG's efforts to qualify alternatives to lead (Pb)-containing dry film lubricants for antigalling/antifretting, antiseizing, and assembly aid applications.
- Parts include threaded fasteners, turbine discs, & blade roots

Potential Alternatives:

3 Pb-free DFLs undergoing Phase IV testing

- Everlube 812
- Everlube 10030
- Tiolube 614-T9B

Benefit/Impact:

- Affects 23 engines: F100, F101, F103, F107, F108, F112, F117, F118, F119, F404/F414, J52, T53, T55, T56, T64, T406, T700, T800, TF30, TF33, TF34 and TF35 engines
- Affects 38 aircraft, missiles
- Eliminates ~1,200 lbs of Pb at DoD depots
- Initial savings -$600K/yr at GEAE

Milestones:

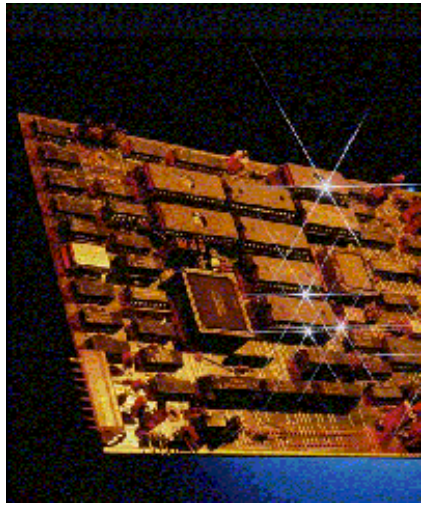
• Completed JTP	Oct 1997
• Began Screen tests	Aug 1997
• PAR Completed	Sep 1998
• Completed Phases I-III testing	Jan 2000
• Interim JTR Completed	Mar 2000
• Phase IV testing	In-progress
• Complete final JTR	Jun 2002

Status:

- Active

Jun 01

Lead-Free Surface Finish and Low-VOC Conformal Coatings (CCAMTF)



Description:

Support the CCAMTF's efforts to quality low-VOC conformal coatings and lead free surfaces for use in circuit card manufacturing

Potential Alternatives:

Conformal Coatings

- No conformal coatings
- Silicone conformal coat
- Urethane conformal coat

Surface Finishes

- Immersion Silver Plating
- Immersion Gold/Palladium Plating
- Benzimidazole Surface Coatings

Benefit/Impact:

- decrease manufacturing costs, simplify rework, and reduce pollution at the source without degrading the circuit card quality or performance
- Potential cost avoidance of $3 million per year is estimated for four defense contractor facilities

Milestones:

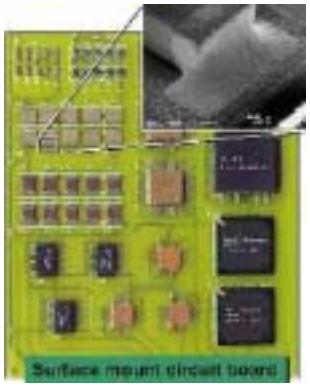
• Begin JTP Testing	Aug 1997
• Complete JTP	Mar 1998
• Complete Testing	May 01
• Publish Final Test Results	Aug 01

Status:

- Active

JG-PP Projects (continued)

Lead Free Electronics Soldering



Description:

- Demonstrate and validate lead-free solders to replace conventional tin-lead solders used on circuit card assemblies, cannon plugs, connectors, and other electronic applications

Benefits/Impacts:

- Affects defense systems across all services
- Reduce worker exposure and hazardous waste
- Reduce Lead emissions

Milestones:

• Kickoff meeting	9 May 2001
• Define scope of Project	20 Jun 2001
• Identify Stakeholders	In progress

Status: Active

JG-PP Projects (continued)

Non-ODS Oxygen Line Cleaning

Benefit/Impact:

- Eliminate CFC-113 use for O2 line cleaning
  - Certify new equipment for on-board use for land-based aircraft
  - Upgrade and and certify existing equipment for either land or shipboard use for off-aircraft lines
- Reduce man-hours associated with O2 line cleaning
- Document joint Service/NASA O2 cleanliness standards

Description:

Demonstrate technologies for ODS-free O2 line cleaning for aerospace vehicles

Alternatives:

- HFE 7100 (solvent) mixed with Krytox alcohol (surfactant) for onboard and off-aircraft cleaning
- Navy Oxygen Cleaner (NOC) for off-aircraft cleaning

Milestones:

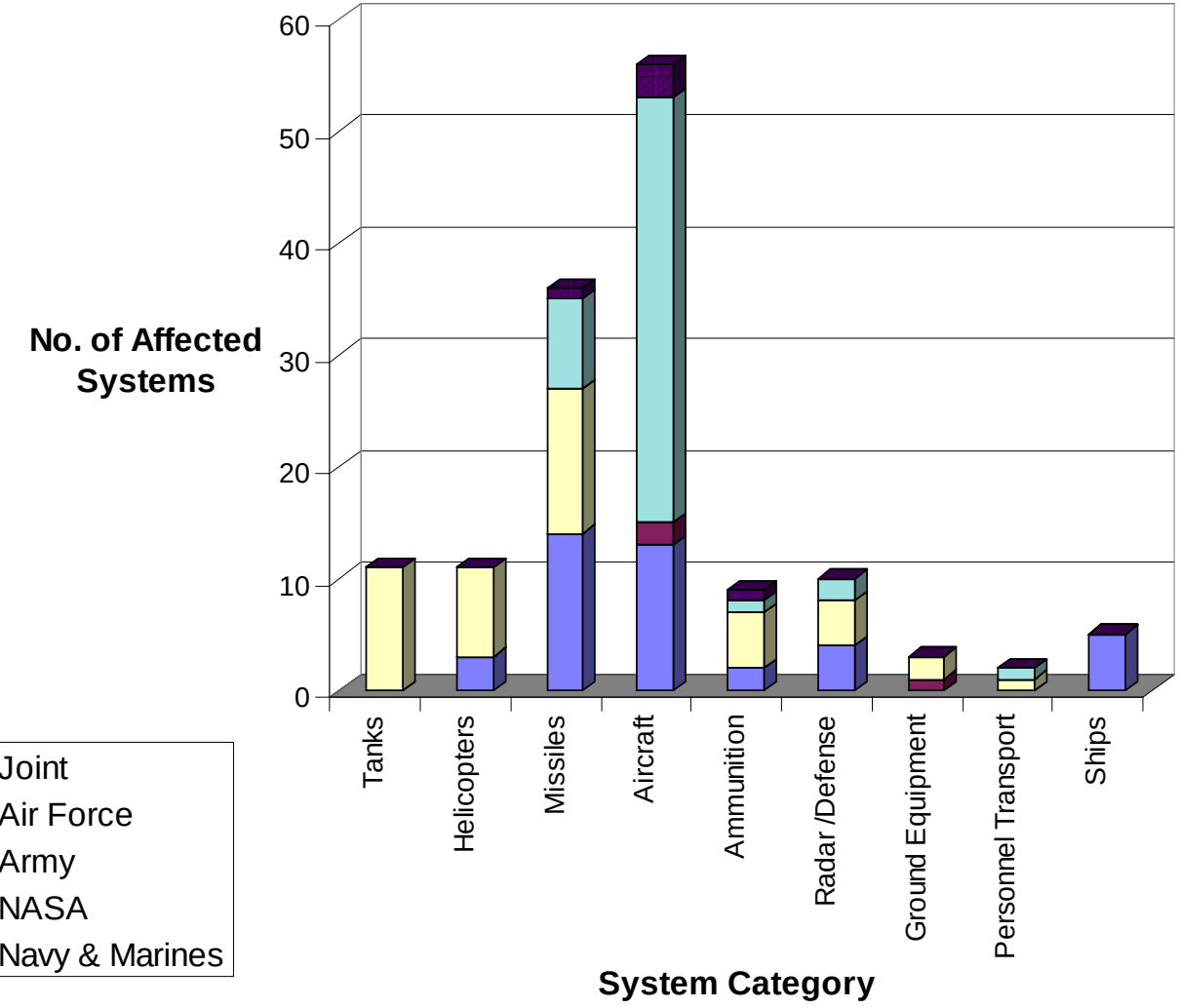
• ESTCP funded	FY98
• JG-PP supported project	Feb 1999
• Complete JTP	Apr 2001
• 85% Design Tests Completed	Nov 2000
• Complete testing	Oct 2001
• Final report/implement	Apr 2002

Status:

- Active

JG-PP Projects *(continued)*

Benefits Across 150 Systems



JG-PP Keys to Success

Partnership

Technical confidence

Proactive Involvement

Communication

Risk Reduction

Reduced costs

JG-PP Vision

Joint Solutions

Common Problems

Shared Efforts

More information JG-PP Website

Visit the JG-PP Website at http://www.jgpp.com

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